

## CLAIMS

1. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, said method comprising:

extracting phonetic information regarding said language;

defining, based on said extracted information, phonological and phonetic units associated with said language;

identifying variations in said language;

developing a maximal set based on said defined phonological units, phonetic units, and identified variations in said language, and

reducing said maximal set to a minimal set of phonemes and allophones, thereby providing for a compact model for acoustically transcribing said language.

2. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said step of extracting information further comprises:

identifying terminological problems associated with said language;

identifying transcription problems associated with said language;

extracting all phonological and phonetic units associated with said language,

and

selecting a representative symbol for the transcription alphabet.

3. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said maximal set comprises any of, or a combination of: phonemes, allophones, rules governing the selection of allophones, a set of examples, and transliteration symbols.

4. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said step of reducing said maximal set further comprises reducing an automatic speech recognition phonetic set.

5. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 4, wherein said step of reducing an automatic speech recognition phonetic set further comprises the use of diacritics, graphemes, and allophones.

6. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said step of reducing said maximal set further comprises reducing a text-to-speech phonetics set.

7. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 6, wherein said step of reducing an text-to-speech phonetics set is accomplished by using allophones and adding symbols representing the phoneme to be geminated.

8 A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said transcription alphabet is in compliance with the International Phonetics Alphabet (IPA).

9. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said language is any of the following: modern standard Arabic (MSA), classical Arabic, or colloquial Arabic.

10. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 1, wherein said phonetic information is extracted over a network.

11. A method for determining a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 2, wherein said network is any of the following networks: local area networks (LAN), wide area networks (WAN), Internet, HTTP-based networks, or wireless networks.

12. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, said system comprising:

a computer system;

a microphone, said microphone interfacing with said computer system, said microphone capable of receiving voice input in said language,

a multimedia kit including full duplex sound card, said multimedia kit interfacing with said computer system, and said multimedia kit receiving said voice inputs from said microphone, and

said computer system receiving said voice input from said multimedia kit and phonetically analyzing said voice inputs using a stored compact set of phonetic alphabets thereby enabling translation of voice-to-text based on said stored compact set of phonetic alphabets.

13. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 12, wherein said multimedia kit further comprises a built-in automatic speech recognition (ASR) utility.

14. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 12, wherein said

multimedia kit recognizes human voice and interprets it into corresponding actions without being speaker dependent.

15. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 14, wherein said speaker dependant includes gender or age.

16. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 12, wherein said compact set of phonetic alphabets is accomplished using diacritics, graphemes, and allophones.

17. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 12, wherein said compact set of phonetic alphabets are compliant with the International Phonetics Alphabet (IPA) standard.

18. A voice control system utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 12, wherein said language is any of the following: modern standard Arabic, classical Arabic, or colloquial Arabic.

19. A voice control method utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, said method comprising:

receiving voice inputs in said language via a microphone;

phonetically analyzing said received voice inputs using a computer-based system,

and

said computer-based system analyzing said voice input using a stored compact set of phonetic alphabets, thereby enabling translation of voice-to-text based on said stored compact set of phonetic alphabets.

20. A voice control method utilizing a compact model to transcribe a language acoustically based on well-defined basic phonetics, as per claim 19, wherein said compact set of phonetic alphabets is accomplished using diacritics, graphemes, and allophones.



LName	A. letter	Sound Features	New Alphabet	Examples	Transcription
Alif	Ā	glottal plosive -	C	ĀōīōāōÉ	Ce.dIl.le
		epiglottal fricative +	0	āōĀōĐōā	mu.0e4.4In
Ba	Ē	bilabial plosive +	b	ĒóÇōōāóÉ	b1.8l.le
	Ēø	geminated bilabial plosive +	B	ĒōāóĒōā	te.ne.Be.0e
Ta	Ē	alveolar plosive -	t	Ēóīúāóíá	teh.l3l
	Ēø	geminated alveolar plosive -	T	ÓōĒøóÉ	sl.Te
Tha	Ē	dental fricative -	F	ĒōāóÇāōíóÉ	Fe.mE.ni.je
	Ēø	gemi <sup>1</sup> nated dental fricative -	FF	āōβóĒøóŸ	mu.keF.Fef
Jim	Ī	velar plosive +	g	ĪóáúÓóÉ	gel.se
		alveolo-palatal fricative +	5		5el.se
	Īø	Geminated velar plosive +	G	āōĒóÚóíĪøā	mu.te.Ve.GIl
Ha			55		mu.te.Ve5.5Il
	Ī	Pharyngeal fricative -	h	ĪóÖóĪNó	ha.6A.rA
Kha	Īø	Geminated pharyngeal fricative -	hh	ÖóĪøóÉ	Slh.ha
	Ī	uvular fricative -	x	ĪóāúÓóÉ	xem.se
Dal	Īø	geminated uvular fricative -	xx	ÇáÓøóĪøóÇä	Ces.sex.xEn
	Ī	alveolar plosive +	d	ĪóÚúā	DeVm
Dal	Īø	geminated alveolar plosive +	D	āōĪøó	me.De
	Đ	dental fricative +	4	ĀĐóÇä	CE.4En



	Ðø	geminated dental fricative +	44	ÇáÐøóÇĖïó	Ce4.4E.tlJ
Ra	Ñ	r flap not retroflexed +	r	ÑóáúÓïíó	ram.s3s
	Ñø	alveolar trill +	R	ÑóþóÑøó	Ce.qA.RA
Za	Ò	alveolar fricative +	z	ÓóíúĖ	Zejt
	Óø	geminated alveolar fricative +	zz	ÍóÒøóäó	xez.ze.na
Sin	Ó	alveolar fricative -	s	ÓóĖóíá	se.b3l
	Óø	geminated alveolar fricative -	ss	ÇóáÓøóĖúĖ	Ces.sebt
Shin	Ó	post alveolar fricative -	c	ÓóÑóßóĖ	ce.ri.ke
	Óø	geminated post alveolar fricative -	cc	ÇáÒøóæøóÇŸ	Cec.ce.WEf
Sad	Õ	pharyngealised s -	S	Õóáøðì	SAI.I3
	Õø	geminated pharyngealised s -	SS	ÇáÕøóíøóÇĬ	CAS.SA.J1d
Dad	Ö	pharyngealised d +	6	ÍóÖóÑó	hA.6A.rA
	Öø	geminated pharyngealised d +	7	ŸöÖøóĖ	fl.7A
Ta	Ø	pharyngealised t -	8	ØóáóÚó	8A.la.Ve
	Øø	geminated pharyngealised t -	9	ÇáĖøøøóÇÑöíøóĖ	Cel.bA.92.rl.Je
Za	Ú	pharyngealised <u>dal</u> +	Z	Úóáøó	ZAI.la
	Úø	geminated pharyngealised <u>dal</u> +	ZZ	ÇáÚøóáóÇă	CAZ.ZA.I1m
Ain	Ú	pharyngeal fricative +	V	ÚóÑúŮ	VAR6

	Úø	geminated pharyngeal fricative +	VV	ΆόΟοΰόόΈ	Ce.clV.Ve
Ghain	Ú	uvular fricative +	P	ÇáŦøöÉóÇÚóΈ	CeS.Si.b1.Pa
	Úø	geminated uvular fricative +	PP	ΈóæóÚøóά	te.weP.Pol
	Ý	labiodental fricative -	f	ÇáúŦóÝúά	Cel.hefl
Fa		labiodental fricative +	v	ΈáöŦÝöŦŦóæä	tl.li.vls.jOn
	Ýø	geminated labiodental fricative -	ff	ÇöŦúΈóŦŦóÝøó	Cls.te.xef.fe
	Þ	uvular plosive -	q	ÞóŦúŦ	QASr
qaf	Þø	geminated uvular plosive -	Q	ÍóÞøóäð	ha.QA.Hu
kaf	ß	velar plosive -	k	ßöáøöŦŦóóΈ	kul.li.Je
	ßø	geminated velar plosive -	K	ΈóäóßøóäóΈ	te.me.Ke.net
	á	alveolar lateral approximant +	l	íóäóΈøöŦ	ju.le.B3
lam	áø	geminated alveolar lateral approximant +	LL	Çááä	CAL.L2X
		geminated pharyngealised l +	ll	ÇóáúäöŦŦóóáøŦŦó Έ	Cel.mu.sel.le.ha
	ã	bilabial nasal +	m	äóŦúŦŦ	mes.5ld
mim	ãø	geminated bilabial nasal +	mm	ÇáäóÇãøóΈ	Cel.Hem.me
	ä	alveolar nasal +	n	äóÚóä	ne.Vem
		velar nasal +	N	ÇóäúßóŦŦó	CaN.ka.ra
nun	äø	geminated alveolar nasal +	nn	ΈóŦŦóäøóÚó	ta.San.na.Va
	â	glottal fricative -	X	ÝóäúŦ	feXd
	âø	glottal fricative +	H	ÚóäóŦŦó	ZA.Ha.rA
ha	âø	geminated glottal fricative +	HH	Έóæóäðóóäð	ta.weH.He.me

waw	æ	labio-velar approximant +	W	ĩōæóá	du.wel
ya	æø	geminated labio-velar approximant +	W	ÇáÊøóáæøĖ	Ce.Te.le.WuF
	ĩ	palatal approximant +	j	íóĩúŮðä	jed.Vom
	ìø	geminated palatal approximant +	J	ÇáÊóĩóĩøðä	Ce.Te.de.Jon
fatha		open mid front	e	ÊóĩúŮðÊóĖ	te5.rl.be
		open front	a	Ŏóĩóþó	SA.da.qa
		low back	A	þóŎóĩ	qA.62
kasra		mid-high mid-front short	i	ÇääøóÇþöĩ	Cen.n1.qld
		close front	I	Āóáóĩ	Ci.IE
damma		close back	u	ĀððøðáðóÇĖ	Cum.me.HEt
		open – mid back	o	ÇáŮðŎóŮóŮ	Cel.Po.raF
alif	mid front long		E	ÇáŎððóĖóÇĖ	Cec.ce.bEb
	open front		1	ÇáúĩóÇŎðĖ	Cel.hE.slb
waw	low back		2	ÇöäúŮðŎóÇá	Cln.fi.S2l
	close back		U	ĖóĩðæŇ	te.dUr
ya	open mid back		O	ĩðßúĖðæŇ	duk.tOr
	mid-high mid-front long		Y	ĀóäúĖöĩŇ	Cem.bYr
	close front		3	ŇóĀĖöĩó	ra.03s

TABLE 2

<b>wegd</b>	<b>æóİúİ</b>
<b>waqt</b>	<b>æóPúÊ</b>
<b>WA6V</b>	<b>æóÖúÚ</b>

(Different symbols that represent short Fatha)

<b>NE.0Im</b>	<b>äÇÆă</b>
<b>N1.qId</b>	<b>äÇpİ</b>
<b>N2.6Ig</b>	<b>äÇÖİ</b>

(Different symbols that represent long Fatha)

TABLE 3

<b>Ben.nEC</b>	<b>ÈóăóÇÁú</b>
<b>Ra.B3</b>	<b>ŃóÈøöí</b>
<b>8A.lab</b>	<b>ØáÈ</b>
<b>CA.9A.lab</b>	<b>ÇáØøóáÈ</b>

(Different symbols that represent gemination)

TABLE 4 **Phonetic Alphabet for Arabic Speech Recognition System**

English Representation	Arabic Letter	SAKHR Phonetic Symbol	Arabic Example
<b>Plosives</b>			
Hamza	أ	F	آÓĬ
Ba	ب	b	ÉíÊ
Dal	د	d	Ĭáíá
Dad	ذ	d%K	ÖäíÑ
Jim	ج	g	ĬÉá
Kaf	ك	k	βâÝ
Qaf	ق	q	ƆÉá
Ta	ت	t	ÊãÑ
Ta	ظ	t%K	ØÑíƆ
<b>Nazals</b>			
Mim	م	m	ãäÖá
Nun	ن	n	äĬã
<b>Trills</b>			
Ra	ر	r	Ñää
<b>Fricatives</b>			
Dal	ڤ	D	ĐäÈ
Za	ظ	D%K	Üá
Ain	ع	F7	Úíä
Ghain	غ	R7	Úíä
Shin	ش	S	ÖäÓ
Tha	ث	T	ÊƆÈ
Kha	خ	X	ĬÑĬ
Fa	ف	f	ÝÑ
Ha	ه	h	äĬÑ
Ha	ح	h>	ĬÑÈ
Sin	س	s	ÓäÇÁ
Sad	ص	s%K	ÖĬĬ
Za	ز	z	Öíä
<b>Approximants</b>			
Ya	ي	j	íæã
Lam	ل	l	áæã

<b>Waw</b>	<b>æ</b>	<b>w</b>	<b>æáĭ</b>
<b>Long Vowels</b>			
<b>Alif</b>	<b>Ç</b>	<b>a:</b>	<b>ĪÈÇá</b>
<b>Ya</b>	<b>í</b>	<b>i:</b>	<b>Īía</b>
<b>Waw</b>	<b>æ</b>	<b>u:</b>	<b>ÈæÑ</b>
<b>Short Vowels</b>			
<b>Fatha</b>	<b>ó</b>	<b>a</b>	<b>Íãá</b>
<b>Kasra</b>	<b>ö</b>	<b>i</b>	<b>ãÑãÉ</b>
<b>Damma</b>	<b>õ</b>	<b>u</b>	<b>ÞóÑÈ</b>